

Applicant: Ashton et al.
For: AN UPPER BUNDLE STEAM GENERATOR CLEANING,
INSPECTION, AND REPAIR SYSTEM

5

1 1. An upper bundle steam generator cleaning, inspection, and repair system
2 comprising:

3 a deployment and support device receivable within the steam generator
4 configured to raise and position a distal end of said device to the upper bundle region of
5 the steam generator;

6 a head subsystem connected to the distal end of the deployment and
7 support device for at least one of cleaning, inspection, and repair of said upper bundle
8 region; and

9 a lateral support subsystem deployable to support said head subsystem
10 within the upper bundle region of the steam generator and retractable to deploy said head
11 subsystem up to the upper bundle region and to withdraw said head subsystem therefrom.

1 2. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 1 in which the lateral support subsystem includes fingers.

1 3. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 2 in which said fingers are rotatable.

1 4. The upper bundle steam generator cleaning, inspection, and repair system

2 of claim 3 in which said fingers are rigid.

1 5. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 1 in which said head subsystem is a bulk cleaning head subsystem.

1 6. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 5 in which said bulk cleaning head subsystem includes a camera.

1 7. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 1 in which said head subsystem is a rigid lance cleaning head subsystem.

1 8. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 7 in which said rigid lance cleaning head subsystem includes a camera.

1 9. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 1 in which said head subsystem is an inspection subsystem.

1 10. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 9 in which said inspection subsystem includes a camera.

1 11. An upper bundle steam generator cleaning, inspection, and repair system
2 comprising:
3 a deployment and support device receivable within the steam generator
4 configured to raise and position a distal end of said device about the upper bundle region
5 of the steam generator, said upper bundle region including tube support plates having
6 flow slots therein;
7 a head subsystem connected to the distal end of the deployment and
8 support device for at least one of cleaning, inspection, and repair of said upper bundle
9 region; and
10 a lateral support subsystem for releasably supporting said head subsystem
11 about said flow slots within said steam generator upper bundle region.

1 12. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 11 in which the lateral support subsystem includes fingers.

1 13. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 12 in which said fingers are rotatable.

1 14. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 13 in which said fingers are rigid.

1 15. The upper bundle steam generator cleaning, inspection, and repair system

2 of claim 11 in which said head subsystem is a bulk cleaning head subsystem.

1 16. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 15 in which said bulk cleaning head subsystem includes a camera.

1 17. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 11 in which said head subsystem is a rigid lance cleaning head subsystem.

1 18. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 17 in which said lance cleaning head subsystem includes a camera.

1 19. An upper bundle steam generator cleaning, inspection, and repair system
2 comprising:

3 a deployment and support device receivable within the steam generator
4 configured to raise and position a distal end of said device to the upper bundle region of
5 the steam generator, said upper bundle region including tube support plates having flow
6 slots therein;

7 a head subsystem connected to the distal end of the deployment and
8 support device for at least one of cleaning, inspection, and repair of said upper bundle
9 region; and

10 a lateral support subsystem for releasably supporting said head subsystem
11 about the tubes of the upper bundles of the steam generator during at least one of said
12 cleaning, inspection and repair.

1 20. An upper bundle steam generator cleaning, inspection, and repair system
2 comprising:
3 a deployment and support device receivable within the steam generator
4 configured to raise and position a distal end of said device to the upper bundle region of
5 the steam generator;
6 a head subsystem connected to the distal end of the deployment and
7 support device for at least one of cleaning, inspection, and repair of said upper bundle
8 region; and
9 a lateral support subsystem for registering said head subsystem within the
10 upper bundle region of the steam generator during at least one of said cleaning,
11 inspection and repair.

1 21. An upper bundle steam generator cleaning, inspection, and repair system
2 comprising:

3 a deployment and support device receivable within the steam generator
4 configured to raise and position a head subsystem within the upper bundle region of the
5 steam generator; and

6 a lateral support subsystem connected to a distal end of the deployment
7 and support device to support said head subsystem and for providing mechanical
8 engagement with and disengagement from a tube support plate within the steam
9 generator.

1 22. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 21 in which said head subsystem is a bulk cleaning head subsystem.

1 23. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 21 in which said head subsystem is rigid lance cleaning head subsystem.

1 24. The upper bundle steam generator cleaning, inspection, and repair system
2 of claim 21 in which said head subsystem is an inspection subsystem.

1 25. An upper bundle steam generator cleaning, inspection, and repair system
2 comprising:
3 a deployment and support device receivable within the steam generator
4 configured to raise and position a distal end of said device to the upper bundle region of
5 the steam generator;
6 a head subsystem connected to the distal end of the deployment and
7 support device for at least one of cleaning, inspection, and repair of said upper bundle
8 region; and
9 a lateral support subsystem for releasably supporting said head subsystem
10 within said generator upper bundle region.

1 26. An upper bundle steam generator cleaning, inspection, and repair system
2 comprising:
3 a deployment and support device receivable within the steam generator
4 configured to raise and position a distal end of said device to the upper bundle region of
5 the steam generator;
6 a rotatable mechanism attached to the distal end of said device;
7 an arm attached on a first end to said rotatable mechanism and rotatable
8 horizontally and vertically by the rotatable mechanism;
9 at least one of a cleaning device, an inspection device and a tool on a
10 second end of said arm; and
11 a lateral support subsystem connected to said arm and deployable to
12 support said at least one of a cleaning device, an inspection device, and a tool, said lateral
13 support subsystem providing mechanical engagement with and disengagement from a
14 tube support plate within the steam generator.